

# NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

May 1, 2012

# Precipitation and Snowpack

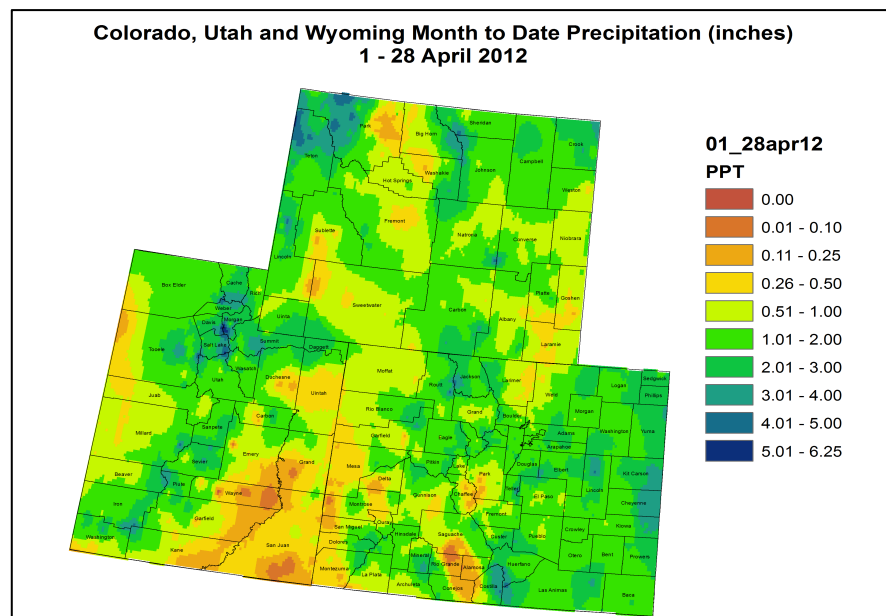


Fig. 1: April month-to-date precipitation in inches.

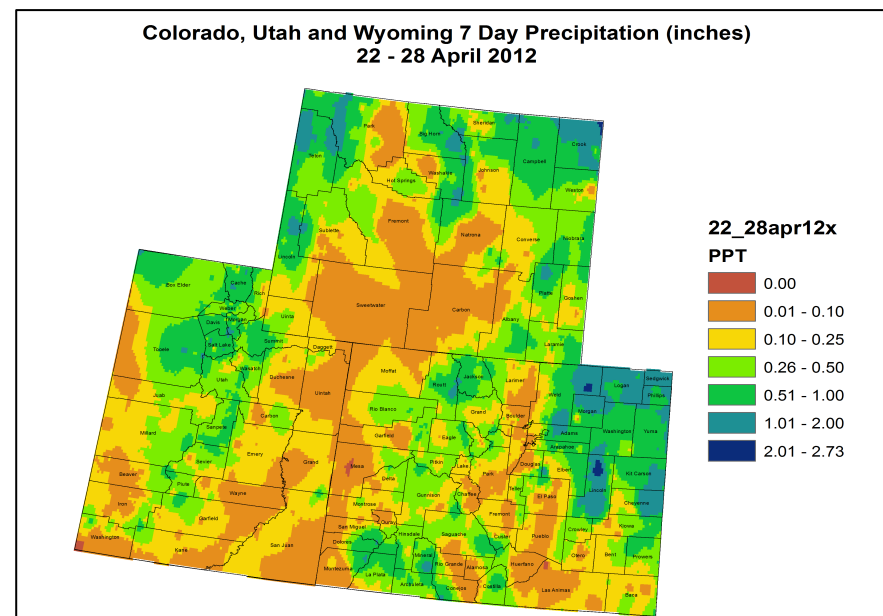


Fig. 2: April 22 – 28 precipitation in inches.

Since the beginning of the month, the Upper Colorado River Basin (UCRB) higher elevations have seen precipitation amounts ranging between 1 and 3 inches, with spotty amounts of over 3 inches in the Wasatch mountains in Utah (Fig. 1). The lower elevations of western Colorado and eastern UT have received amounts ranging between a quarter inch and 1 inch, with the Colorado River valley just above Lake Powell receiving less than a quarter inch since the beginning of the month. Most of CO, east of the UCRB, has received between 1 and 2 inches of precipitation, though short-term dryness shows up in northern CO and in the South Park valley. The San Luis Valley has also been drier, seeing less than a quarter of an inch for the month.

Last week, the heaviest precipitation fell in the higher elevations of the UCRB, with accumulations ranging from a quarter inch to an inch (Fig. 2). The lower elevations of the UCRB received less than a quarter of an inch for the week. East of the basin, northeast CO received over half an inch for the week, with some locations seeing more than an inch of moisture. Southeast CO was a bit drier for the week, though they did receive additional precipitation of around half an inch on Sunday (not shown on map).

Snotel Water Year Precipitation Percentile Ranking for  
30 April 2012 (Stations with 15+ years of data only)

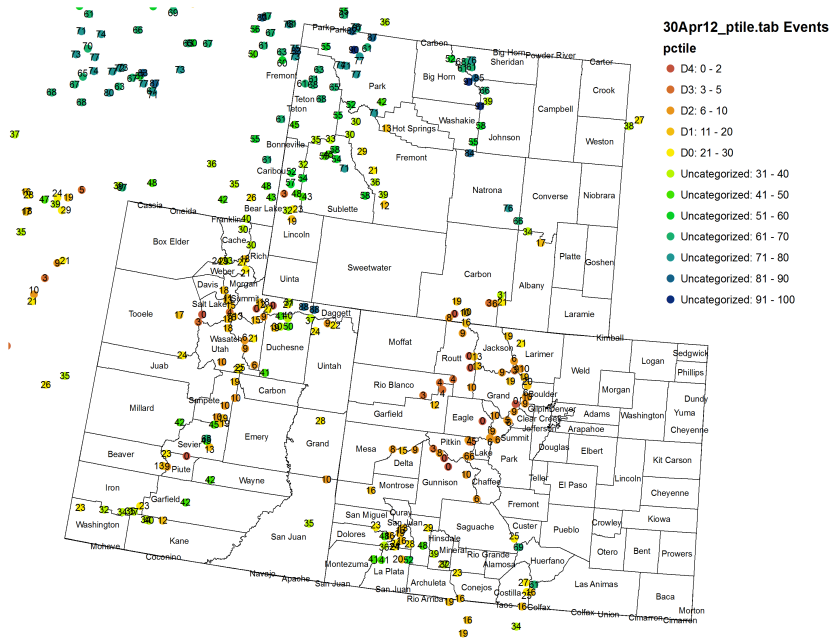


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

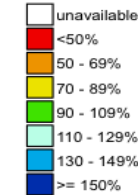
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the Yampa and Gunnison basins in CO, with many sites reporting in the lowest 5<sup>th</sup> percentile or below (Fig. 3). The Wasatch range in UT and the northern mountains of CO are also dry, with most precipitation percentiles in the teens. SNOTEL percentiles in the Upper Green basin in WY are generally above the 40<sup>th</sup> percentile. In the San Juan basin, many SNOTEL percentiles are above the 30<sup>th</sup> percentile, but there are an increasing number of SNOTELs now recording below the 30<sup>th</sup> percentile.

Snowpack conditions around the UCRB are all well below average and many sites have completely melted out (Fig. 4). This is a combined result of less than average seasonal snowpack accumulations and much earlier melting (seasonal peaks one month earlier than normal). Nearly all of the sub-basins are near or below 30% of average. The lowest averages are in eastern UT. In the northern-most part of the UCRB in WY, one sub-basin is still recording 48% of average snowpack.

Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Apr 30, 2012

Current Snow Water  
Equivalent (SWE)  
Basin-wide Percent  
of 1971-2000 Normal



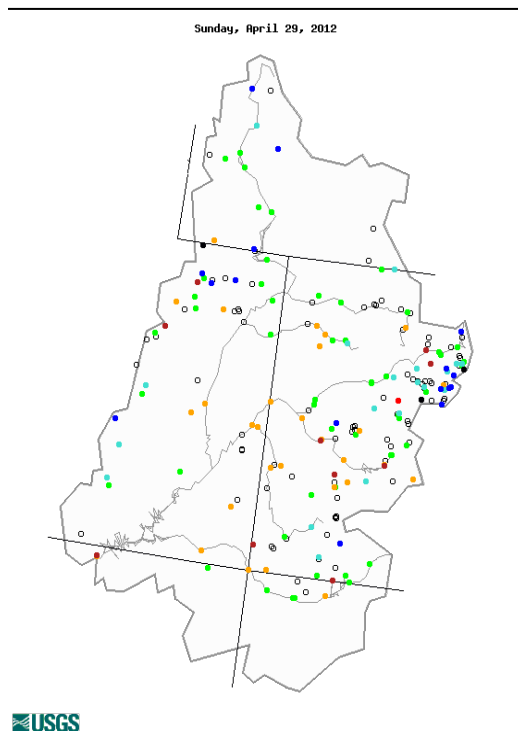
\* Data unavailable  
at time of posting  
or measurement  
is not representative  
at this time of year

Fig. 4: Basin snow water equivalent (SWE) as a percent of average.

# Streamflow

As of April 29<sup>th</sup>, 69% of the USGS streamgages in the UCRB recorded normal (25<sup>th</sup> – 75<sup>th</sup> percentile) or above normal 7-day average streamflows (Fig. 5). About 30% of the gages in the basin are recording above normal flows, while about 31% of the gages in the basin are recording below normal flows. Most of the gages on the Green River in WY are showing near normal flows, while streamflow on the Gunnison River is below normal. Flows on the Colorado and San Juan rivers are variable. Higher flows are concentrated near the Colorado headwaters region.

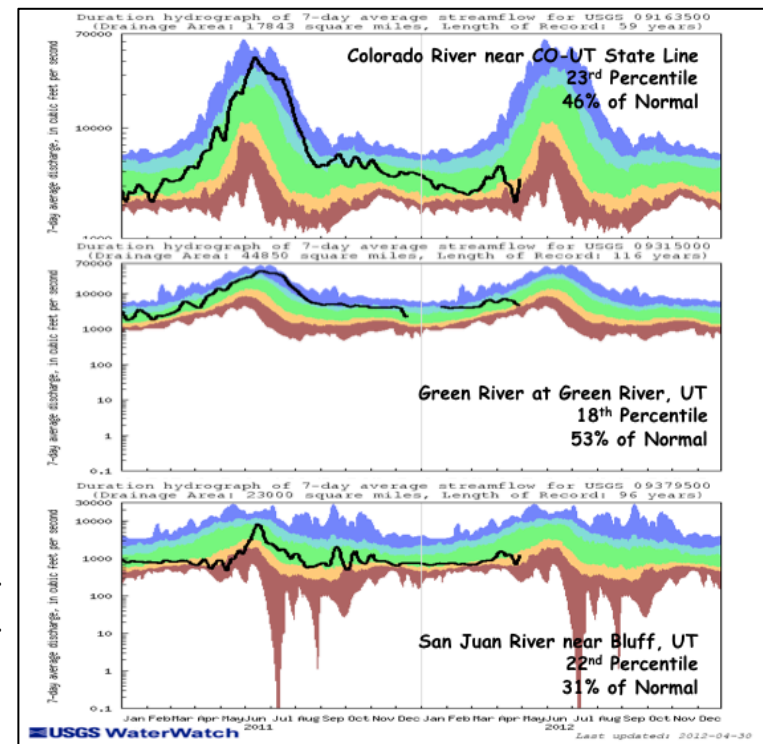
Flows on two key gages in the UCRB showed increases last week, while one continued to show decreasing flows (Fig. 6). Flows on the Green River at Green River, UT dropped into the below normal range at the 18<sup>th</sup> percentile (down from the 42<sup>nd</sup> percentile last week). Flows on the Colorado River near the CO-UT state line and the San Juan River near Bluff, UT both increased last week, but are still in the below normal range, at the 23<sup>rd</sup> and 22<sup>nd</sup> percentiles, respectively.



| Explanation - Percentile classes   |                                    |                                       |                                      |                                     |                                     |                                      |                                     |
|------------------------------------|------------------------------------|---------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|
| <span style="color: red;">●</span> | <span style="color: red;">●</span> | <span style="color: orange;">●</span> | <span style="color: green;">●</span> | <span style="color: cyan;">●</span> | <span style="color: blue;">●</span> | <span style="color: black;">●</span> | <span style="color: gray;">○</span> |
| Low                                | <10                                | 10-24                                 | 25-75                                | 76-90                               | >90                                 | High                                 | Not-ranked                          |
|                                    | Much below normal                  | Below normal                          | Normal                               | Above normal                        | Much above normal                   |                                      |                                     |

Fig. 5: 7-day average discharge compared to historical discharge for April 29<sup>th</sup>.

Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).



# Water Supply and Demand

All of the UCRB experienced above average temperatures for the week, parts of the Gunnison and San Juan basins experiencing temperatures 9 to 12 degrees above average. All of eastern CO also experienced much warmer than average temperatures last week as well. The VIC model shows dry soil moisture conditions in eastern CO, in UT around the Colorado River and Green River valleys, and in southern WY (Fig. 7). The VIC shows very wet soils around the Colorado headwaters region (likely due to early melting of snowpack infiltrating the soils), however this area of wet soils is decreasing in size and intensity. When VIC SWE and soil moisture are combined, the UCRB shows a moisture storage deficit (Fig. 7).

All of the reservoirs above Lake Powell are currently above their April storage averages. Lake Dillon and Flaming Gorge have seen storage volume decreases since the beginning of the month. The rest of the major reservoirs have been increasing in volume since the beginning of the month. Lake Powell is currently at 84% of average and 64% of capacity (compared to 52% one year ago). Compared to 2002 (the UCRB's most severe drought in recent history), water supply is in better condition with all of the major reservoirs above Lake Powell at higher levels than in April of 2002.

## Precipitation Forecast

UCRB will be in between a dry ridge of high pressure located over the western high plains and a deepening trough of low pressure over the Pacific Northwest. This trough will remain anchored over western Oregon through most of the week, and bring a persistent chance of light showers to the extreme northwest parts of the basin. Where precipitation does fall expect liquid accumulations to be around 0.25 inches, with localized areas of 0.50 inches possible through Friday. The Pacific Northwest trough begins to move southeast through the weekend with large differences in forecast path. Best chance of showers and isolated thunderstorms with this feature will likely remain over the northernmost fringes of the UCRB, while the majority of the region remains dry well into next week.

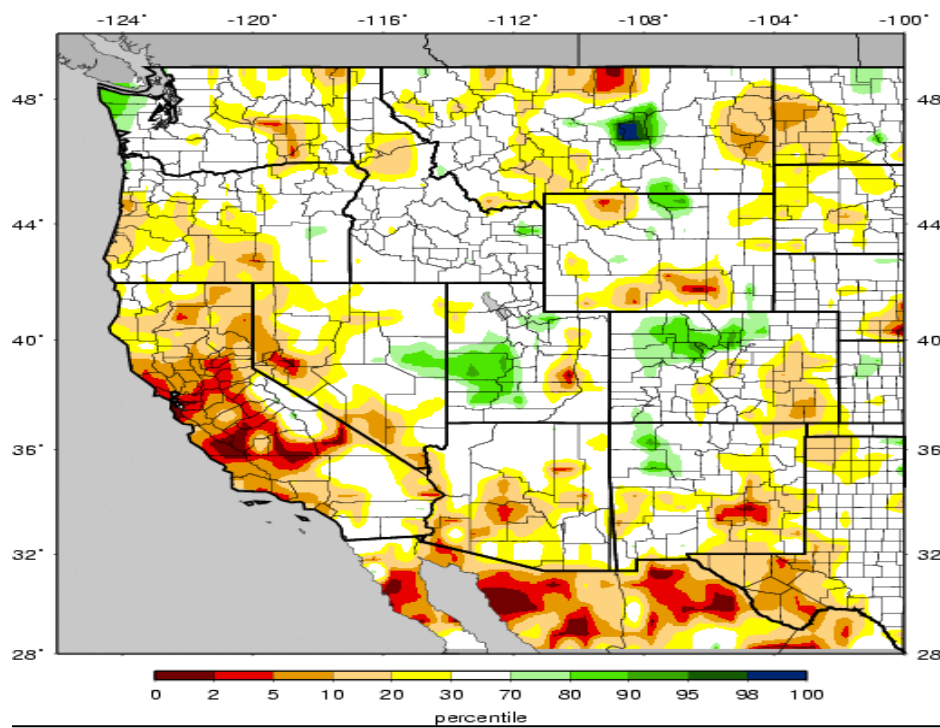


Fig. 7: VIC soil moisture percentiles as of April 29<sup>th</sup>, with total moisture storage (SWE and soil moisture) below.

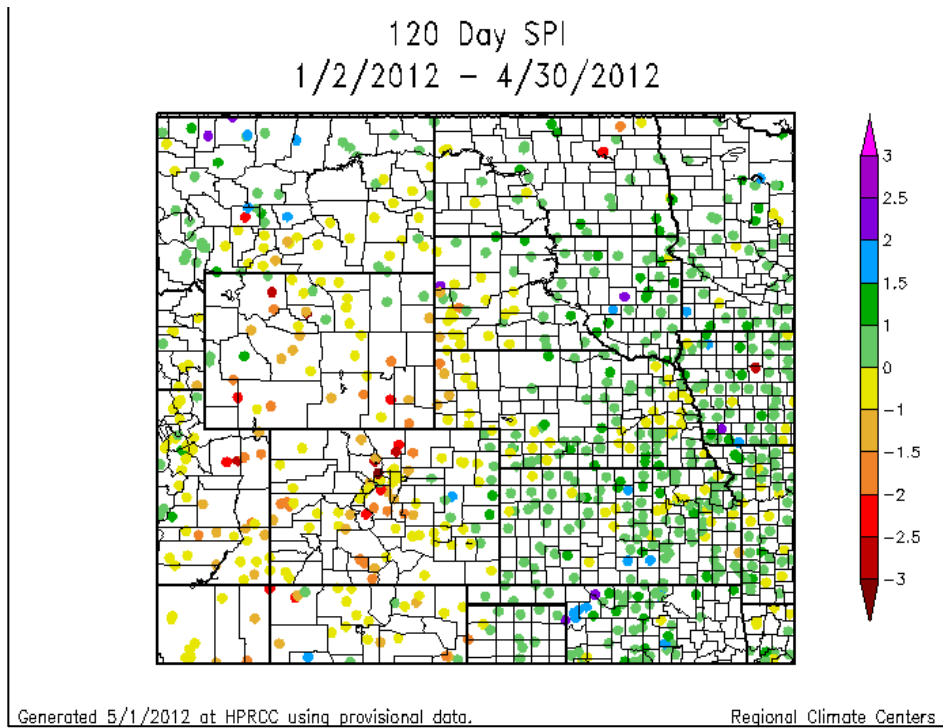
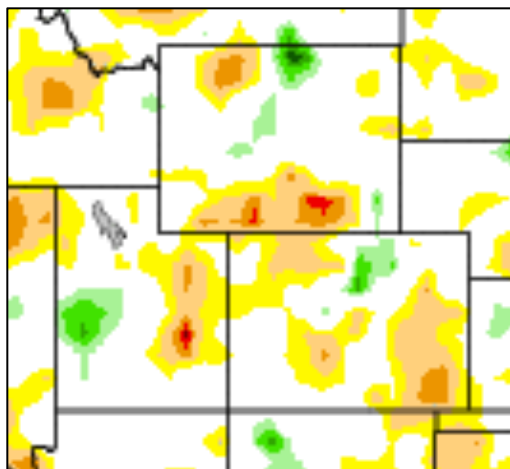


Fig. 8: Standardized precipitation indices (SPIs) for the 120-day time scale as of April 30<sup>th</sup>.



# Drought and Water Discussion

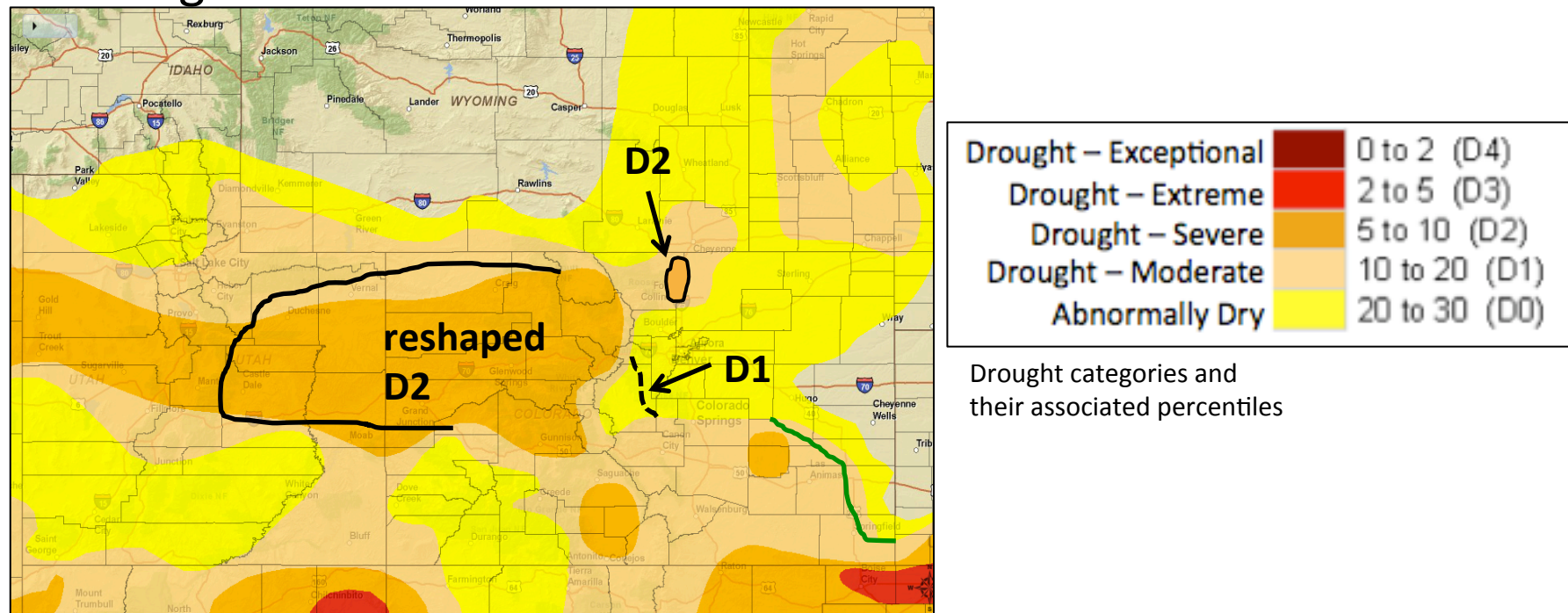


Fig. 9: April 24<sup>th</sup> release of U.S. Drought Monitor for the UCRB.

Looking at the current depiction of the U.S. Drought Monitor (USDM) map, it is recommended that the D2 in eastern UT and western CO be slightly adjusted (Fig. 9, black line). Based on several different time scales of SPIs (Fig. 8), it doesn't appear that the southern parts of Mesa County, CO and Grand County, UT are as dry as the northern parts. Also, the SPIs and SNOTEL precipitation percentiles west of Emery County, UT don't warrant D2 at this time. SPIs do support a slight northward expansion of the D2 in northeast UT and northwest CO though. As for the exact D2 delineation in western UT, we defer to the USDM author and local experts.

Also recommended is a D2 introduction around Fort Collins, CO (Fig. 9, black outlined orange shape) where short-term SPIs out to 120-days are all less than -2. An expansion of D1 to cover the South Park valley is also recommended (Fig. 9, dashed line). Based on excellent precipitation over the past month, a slight improvement of the D1 in southeast CO is recommended (Fig. 9, green line).